FORT STEWART, GEORGIA

CONTRACT NO. DACW43-96-D-0525

SCOPE OF WORK

FORT STEWART, GA.
AERIAL PHOTOGRAPHY AND MAPPING
U.S. ARMY CORPS OF ENGINEERS
PHOTO SCIENCE, INC.
DELIVERY ORDER NO.

DESCRIPTION OF WORK

Mapping of portions of Fort Stewart, Ga. has been requested. The area to be mapped is approximately 279,280 acres. The final mapping products requested are digital elevation models (DEM) and color infrared digital orthophotos at a horizontal scale of 1"=10001. Aerial photography will be flown at 20,000 ft above mean terrain (AMT) with a negative scale of 1"=3333' (1:40,000). Airborne Global Positioning System (GPS) control will be used in conjunction with minimal ground survey control to perform aerotriangulation (AT), and develop digital elevation models (DEM) from the color IR aerial photography for digital orthophoto production. **The maps will fully comply with National Map Accuracy Standards for mapping at a horizontal scale of 1"=3333'.**

INFORMATION SUPPLIED BY THE GOVERNMENT

a. Map showing project area.

b. Available existing ground control within and around the project site.

WORK TO BE PERFORMED BY THE CONTRACTOR

Contractor shall provide equipment, supplies, facilities, and personnel to accomplish the following work:

a. Contractor will establish a ground survey control network for airborne GPS and fly and photograph the project area at an altitude of 20,000' AMT with a negative scale of 1"=3333' in color IR. The color IR photography will be accomplished with airborne GPS utilizing dual frequency/multi channel receivers. Photography will be flown with 80% forward lap and approximately forty percent side lap. GPS data collection and processing will include latitude, longitude and ellipsoid elevation for each photo center. All airborne GPS planning including survey network layout, benchmarks to be used, etc. shall be approved by CELMS- ED-HG before initiation of project. Plan submitted shall include but not be limited to maps indicating proposed GPS network, benchmarks to be used, flight lines, and project area.

b. Additional ground survey data will be collected to use in the mapping process and to check the final mapping. Approximately seven horizontal/vertical points will be established.
The plan for additional ground survey control required for mapping and procedures to accomplish the ground survey control will be submitted to CELMS-ED-HG for approval before initiation of the project. In addition, CELMS-ED-HG will provide approximate locations for 5 check profiles to be established and submitted directly to CELMS-ED-HG to be used as an additional check of the topographic mapping. The check profiles will be 1000' in length or shorter with an elevation established approximately every100'. All original notes for these surveys shall be submitted and no copies shall be made by the contractor. All surveys shall be accomplished in accordance with the technical section of Contract DACW43-96-D-0525.

c. Two sets of color IR prints will be made in accordance with the technical section of Contract DACW43-96-D-0525. One set of the color IR prints will be used as control photos for mapping. The control prints will have all ground control marked on the back and front of each photo. All color IR photography, in the border areas, will include the GPS latitude/longitude, the negative scale (as a ratio), the dates of photography, flight line and frame numbers and the title "Fort Stewart, GA..”

d. Utilizing GPS survey data along with conventional ground control (panel data and photo identifiable data) perform analytical aerotriangulation to generate sufficient photo control points to accomplish National Map Accuracy mapping at a horizontal scale of 1"=3333' for ortho photography at 1"=1000' horizontal scale.

e. Color IR diapositives will be prepared for aerotriangulation procedures and DEM preparation. Simultaneously, along with aerotriangulation analytical diapositives orthophoto diapositives will be prepared and control transferred to them for digital orthophoto rectification and aerotriangulation.

Before transfer, diapositives will be checked for scratches, blemishes, or other abnormal markings. Unacceptable diapositives will be attached to a quality check form indicating the location and type of abnormality and will be returned to the photographic laboratory.

Upon acceptable completion of diapositive check, control points will be transferred from the analytical diapositive to the orthophoto diapositive using a Wild Pug IV point transfer instrument or equivalent.

f. Utilizing the 1"=3333' photography develop digital elevation models, scan photography at 1250 dpi and create digital orthophotos. The orthophotography will have 3' ground pixel resolution.

The contractor will develop Digital Elevation Models (DEM's) for digital ortho-rectification. The following procedure **will be used:**

DEM data will be captured using analytical stereo data capture systems by means of single point elevations (X, Y and Z).

DEM data will be collected for each map sheet and upon completion of each area, all data will be merged into one data set. The data set will then be processed and the DEM reviewed and edited for completeness and correctness.

Checked and approved orthophoto diapositives will be scanned for 3' pixel resolution at 1250 dpi utilizing an Optronics Pixelgetter scanner or equivalent. The scanner must be capable of scanning color data in one pass.

Digital imagery will be set up and oriented on an International Imaging System IVAS 600 or equivalent and spatial resection and coordinate transformation will be performed, as a quality control check the following will be performed before ortho-rectification:

Each fiducial mark will be visited with the system cursor to obtain its sample/line location in the image.

The RMSE of the fiducial will be calculated and examined for accuracy.

RMSE for each control point used in the resection will be reported. Any unacceptable RMSE will be discarded. The newly resectioned image will be visually checked for pixel drop out and/or other artifacts, which may degrade the final orthphoto image.

DEM will be in ASCII format and will be checked to verify that each point or breakline has a feature code. The coordinate/projection system will also be verified at this stage. Scaled and hillshade DEM images will be inspected for missing or poor data.

Rectification of all required imagery will be performed and checked. All control panels or visible photo identifiable points will be visited on the screen and the X and Y location will be displayed. This information will be checked against the ground survey data. Visual checks of the image quality will be performed. Radiometric variation will be checked with image histogram analysis including linear selected contrast stretch, histogram normalization and histogram contrast stretch, user clipping.

g. Produce digital color IR orthophotos of the site at1"=1000' with a pixel resolution of 3'. Digital orthophoto data will be raster file form in ARC/INFO and ERDAS format.

DELIVERY ITEMS

a. Copy of computer printout of aerotriangulation solution. Aerotriangulation report as defined in section 3c.

b. Copy of each stereomodel orientation report.

c. One copy of digital color IR ortho photo files at a horizontal scale of 1"=1000' at 3'ground pixel resolution on CD- ROM disks. The digital ortho files will be in ERDAS and ARC/INFO formats.

d. All survey data (including ground surveys and airborne GPS surveys), raw GPS files (airborne and ground), any other survey information developed and or collected for the project and all check profile data.

e. Two sets of all necessary color IR diapositives.

f. Flight line index for the project on paper maps indicating the flight lines and beginning and ending frames for each flight line along with altitude and negative scale of the photography.

g. Return all manuscript copies, horizontal and vertical control information, aerial photographs, pugged diapositives, and aerial film to the government when the project is completed.

SCHEDULE AND SUBMITTAL

a. The contractor will deliver all remaining final products including CD-ROM digital data files by:

b. All material to be furnished by the contractor shall be delivered at the Contractors expense to : **U.S. ARMY CORPS OF *ENGINEERS*, ST. LOUIS *DISTRICT*, 1222 SPRUCE *STREET* ST. LOUIS, MO-28336 3103.**

TIME EXTENSIONS

In the event, these schedules are exceeded due to causes beyond the control and without fault or negligence of the contractor, this delivery order will be modified in writing and the delivery order completion date will be extended one calendar day for each calendar day of delay.